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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/621,194	07/15/2003	Ford B. Grigg	108298637US1	2349

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EXAMINER
ANDUJAR, LEONARDO

ART UNIT	PAPER NUMBER
2826	

DATE MAILED: 12/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/621,194	GRIGG, FORD B.	
	Examiner	Art Unit	
	Leonardo Andújar	2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *38-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *38-45* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 July 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *01/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 40 is objected to because of the following spelling errors: in line 6 the term "sold r" should be replaced by "solder" and the article "th " should be replaced by "the". .Appropriate correction is required.

Claim Rejections - 35 USC § 103

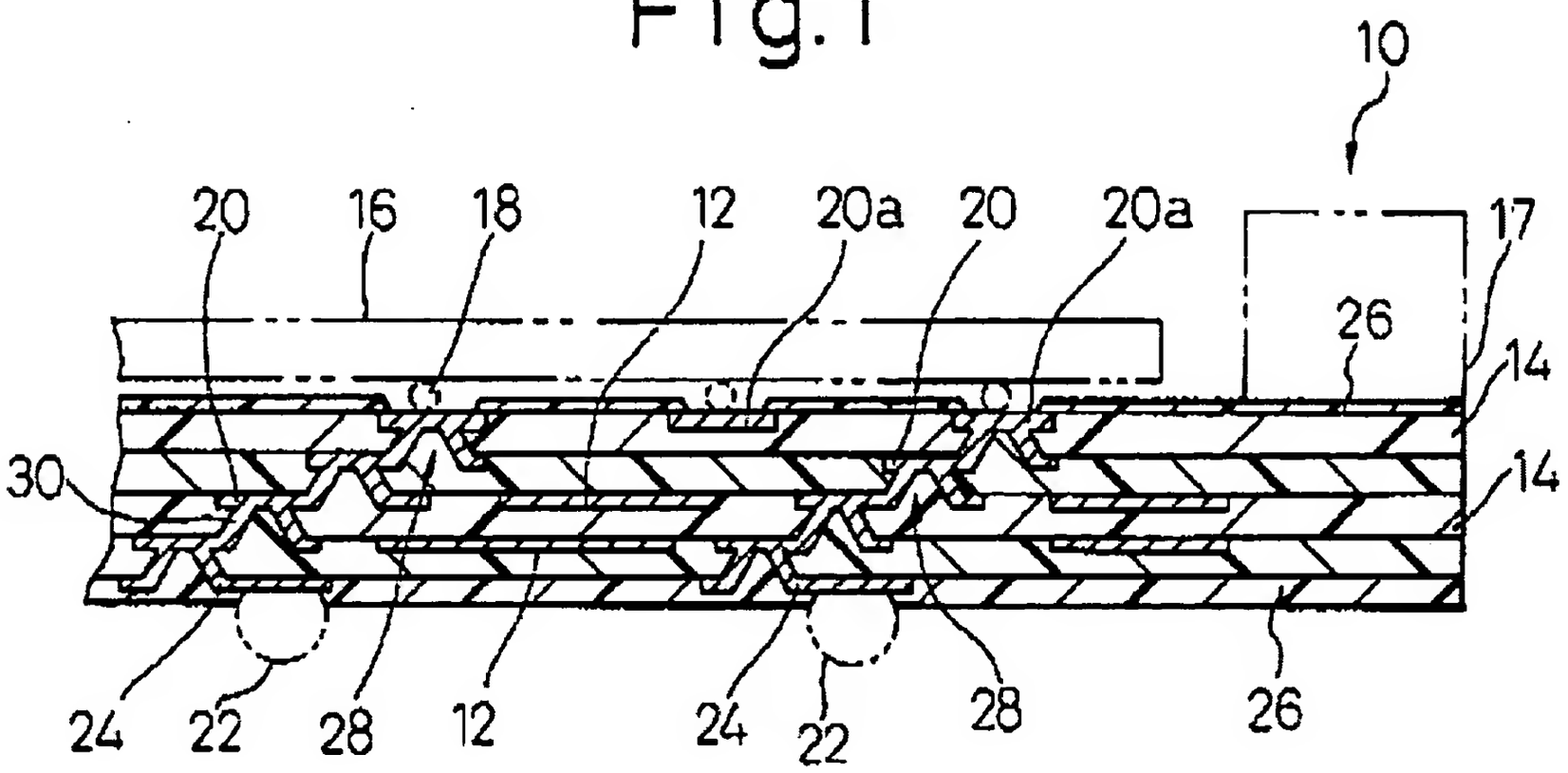
2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 38 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rokugawa et al. (US 6,418,615) in view of Mizukoshi (US 5,578,525).

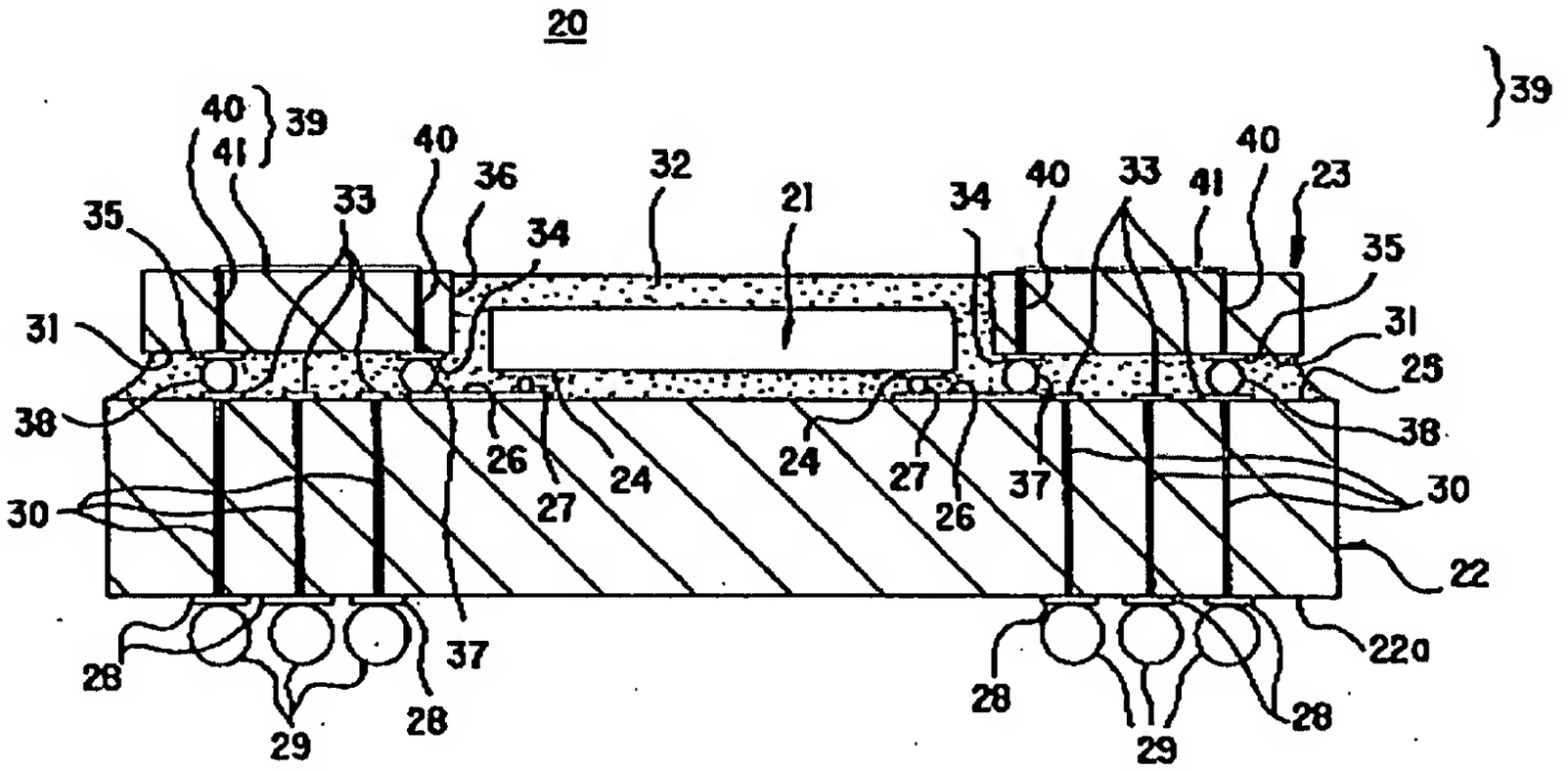
4. Regarding claim 38, Rokugawa (e.g. fig. 1) shows a microelectronic die having an integrated circuit 16 and a plurality of bond-pads (the die region contacting the bumps 18) coupled to the integrated circuit; an interposer substrate 14 coupled to the die, the interposer substrate having a plurality of ball-pads 20a electrically coupled to the bond-pads on the die and a solder-mask 26 having openings over the ball-pads; a plurality of solder-balls 18 arranged so that each solder-ball is in an opening in the solder-mask and contacting a corresponding ball-pad. Rokugawa does not show a dielectric compound surrounding a perimeter portion of each of the ball-pads and the solder-balls.

Fig.1



On the other hand, Mizukoshi (e.g. fig. 4) shows a microelectronic die having an integrated circuit 21 and a plurality of bond-pads 24 coupled to the integrated circuit; an interposer substrate 22 coupled to the die, the interposer substrate having a plurality of ball-pads 26 electrically coupled to the bond-pads on the die and; a plurality of solder-balls 27 arranged so that each solder-ball is contacting a corresponding ball-pad. Furthermore, Mizukoshi shows a dielectric compound 32 completely covering the integrated circuit and the interposer's top surface wherein the dielectric compound surrounds a perimeter portion of each of the ball-pads and the solder-balls.

FIG.4



It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a dielectric compound over the IC and over the whole top surface of the interposer disclosed by Rokugawa including the a perimeter portion of each of the ball-pads and the solder-balls as suggested by Mizukoshi to provide a reliable attachment between the chip and the interposer and to provide moisture protection to the IC and to the interposer wiring pattern.

5. Regarding claim 39, Mizukoshi teaches that the dielectric compound includes a flux since Mizukoshi teaches that the compound is a fluid resin (col. 5/lls. 38-51).

6. Claims 38-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (hereafter APA) in view of Mizukoshi (US 5,578,525).

7. Regarding claim 38, APA (e.g. pp. 0002-0004 shows a microelectronic die having an integrated circuit and a plurality of bond-pads coupled to the integrated

circuit; an interposer substrate coupled to the die, the interposer substrate having a plurality of ball-pads electrically coupled to the bond-pads on the die and a solder-mask having openings over the ball-pads; a plurality of solder-balls arranged so that each solder-ball is in an opening in the solder-mask and contacting a corresponding ball-pad. APA does not show a dielectric compound surrounding a perimeter portion of each of the ball-pads and the solder-balls. On the other hand, Mizukoshi (e.g. fig. 4) shows a microelectronic die having an integrated circuit 21 and a plurality of bond-pads 24 coupled to the integrated circuit; an interposer substrate 22 coupled to the die, the interposer substrate having a plurality of ball-pads 26 electrically coupled to the bond-pads on the die and; a plurality of solder-balls 27 arranged so that each solder-ball is contacting a corresponding ball-pad. Furthermore, Mizukoshi shows a dielectric compound 32 completely covering the integrated circuit and the interposer's top surface wherein the dielectric compound surrounds a perimeter portion of each of the ball-pads and the solder-balls.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a dielectric compound over the IC and over the whole top surface of the interposer disclosed by APA including the a perimeter portion of each of the ball-pads and the solder-balls as suggested by Mizukoshi to provide a reliable attachment between the chip and the interposer and to provide moisture protection to the IC and to the interposer wiring pattern.

8. Regarding claim 39, Mizukoshi teaches that the dielectric compound includes a flux since Mizukoshi teaches that the compound is a fluid resin (col. 5/lls. 38-51).

9. Regarding claim 40, APA (pp 0002-0004) shows a microelectronic die having an integrated circuit and at least one bond-pad coupled to the integrated circuit; an interposer substrate coupled to the die, the interposer substrate having at least one ball-pad electrically coupled to the bond-pad on the die, a trace line adjacent to the ball-pad, and a solder-mask having an opening over the ball-pad. Also, a solder-ball over the ball-pad is taught. APA does not show a dielectric compound in the opening in the solder-mask that electrically insulates the ball-pad and the solder-ball from any exposed potion of the adjacent trace line in the opening. Nevertheless, Mizukoshi shows a dielectric compound 32 completely covering an integrated circuit 21 and an interposer's top surface 22 wherein the dielectric compound insulates the ball pad 26 and the solder ball 27 form an exposed portion of an adjacent trace 33 on the top surface.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a dielectric compound over the IC and over the whole top surface of the interposer disclosed by APA including the opening in the solder mask that includes the ball pad, the solder ball and the exposed portion of the adjacent trace line as suggested by Mizukoshi to provide a reliable attachment between the chip and the interposer and to provide moisture protection to the IC and to the interposer wiring pattern.

10. Regarding claim 41, Mizukoshi teaches that the dielectric compound includes a flux since Mizukoshi teaches that the compound is a fluid resin (col. 5/lls. 38-51).

11. Regarding claim 42, APA teaches a circuit board having a contact couple to the solder ball (pp 0003).

12. Regarding claims 43 and 44, APA teaches an eutectic paste proximate to the contact and to the solder ball (e.g. pp 0003)

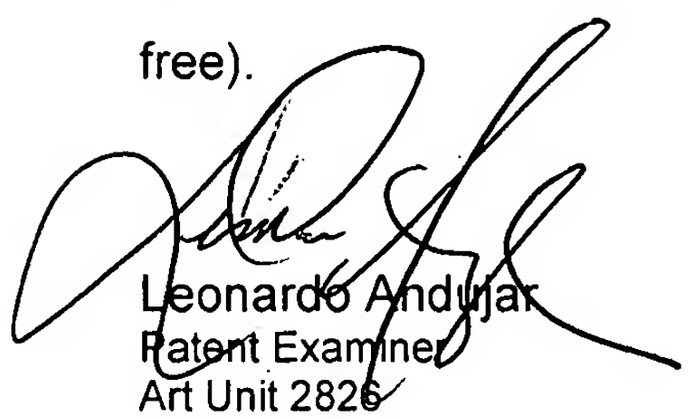
13. Regarding claim 45, APA in vie w of Mizukoshi shows that the dielectric compound in the opening covers an exposed portion of the adjacent trace line since Mizukoshi shows that the whole top surface of the interposer is covered by the dielectric compound including the adjacent trace whereas APA teaches the opening expose the trace.

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonardo Andújar whose telephone number is 571-272-1912. The examiner can normally be reached on Mon through Thu from 9:00 AM to 7:30 PM EST. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J. Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

15. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public

PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Leonardo Andujar
Patent Examiner
Art Unit 2826
12/03/2004